Chapter 29

Lake Tahoe

Lake Tahoe, which lies on the border between Nevada and California, has been described as a national treasure because of its beauty and clarity. Congress considered making the lake a National Park in the 1912, 1913, and 1918 sessions, but the effort was never successful. The Lake Tahoe Basin draws visitors from all over the world every year for its scenic beauty; outdoor activities such as skiing, hiking and boating; and its casino and entertainment industry.

Mark Twain (1872), in his book "Roughing It" described Lake Tahoe as "the fairest picture the whole earth affords." He went on to say that "three months of camp life on Lake Tahoe would restore an Egyptian mummy to his pristine vigor, and give him the appetite like an alligator. I do not mean the oldest and driest mummies, of course, but the fresher ones."

Geologically, the Lake Tahoe Basin is quite interesting and complex. To understand the entire geologic history, the formation of the Sierra Nevada would need to be discussed, which would take up a few book chapters in itself. Focusing specifically on Lake Tahoe, the present basin was originally formed a few million years ago when huge pressures along two major parallel faults caused the uplift of rock blocks to the east and west of present Lake Tahoe Basin. The uplifted blocks, composed mostly of granite, formed mountain ranges surrounding the present lake, whereas the dropped block between the two uplifted blocks created the valley now occupied by Lake Tahoe.

Following the creation of the valley, a river flowed between the two high ridges. The river flowed for millions of years before another geologic event changed things. Lava flows from the now-extinct volcano Mt. Pluto spread across the northeastern part of the valley and formed a natural dam. The valley filled with water and a natural lake was formed, spilling out at the present Truckee River at Tahoe City. During the Pleistocene (what we often refer to as the Ice Age), glaciers filled many of the valleys in the Lake Tahoe Basin and eroded large amounts of rock and creating U-shaped valleys. Many of the smaller lakes in the Lake Tahoe Basin were formed in depressions created by the glaciers or behind large ridges of glacial sediment called moraines.

The result of these geologic events is the present Lake Tahoe. Lake Tahoe is the second deepest lake in the U.S. (maximum depth is 1,645 feet), and the tenth deepest lake in the world. The lake is about 22 miles long (north to south) and about 12 miles wide, and has an average depth of 1,000 feet. The surface area of Lake Tahoe is 191 square miles and the average surface elevation is 6,225 feet above mean sea level (this fluctuates with seasonal and climatic changes in streamflow into and out of the lake and evaporation) (U.S. Geological Survey, 2004).

The Carson Range separates the Lake Tahoe Basin from Carson City and the Carson Valley. It is interesting to note that the bottom of Lake Tahoe is actually lower than the elevation of Carson City. For those who have driven from Carson City to Lake Tahoe, this is a good visualization of the depth of the lake.

So, how much water is in Lake Tahoe? According to the Lake Tahoe Data Clearinghouse (U.S. Geological Survey, 2004), the water contained in Lake Tahoe, if distributed over a land area the size of California, would cover the entire State with 14 inches of water. Another interesting fact provided on this web site is that the amount of water in Lake Tahoe is equivalent to what could supply every person in the U.S. with 50 gallons of water per day for 5 years.

Lake Tahoe is fed by 63 tributaries that flow into the lake from around the basin. Only one stream, the Truckee River, flows out of the lake. Although a number of communities dot the shoreline, the majority of the Lake Tahoe Basin is undeveloped and much of this land area is managed by the U.S. Forest Service.

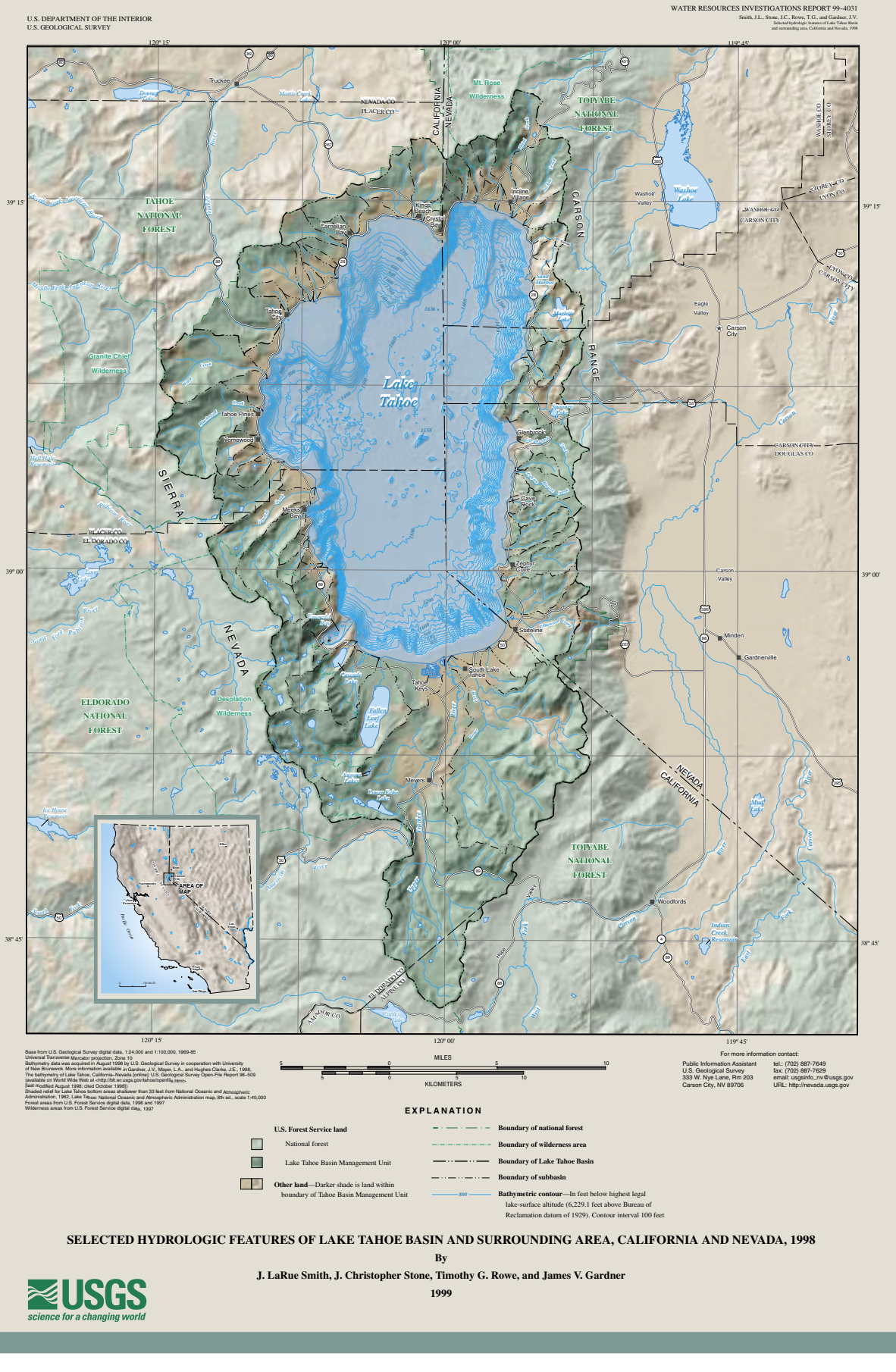
The lake has an interesting history. The Washoe people spent summers along Lake Tahoe, hunting and fishing in the area for thousands of years. The first recorded sighting of Lake Tahoe by a non-Native American was during an expedition led by John C. Fremont in 1844. In the 1860s, with the development of mining in Virginia City, the growth of other cities like Carson City and Reno, and the building of the Transcontinental Railroad north of Lake Tahoe, demand for wood from the Lake Tahoe Basin grew. Much of the forested land in the basin was clear-cut in the 1870s and 1880s. As mining began to fade and Lake Tahoe was "discovered" by people in California and Nevada looking for a vacation spot, the forest industry began to be replaced by the tourist industry. And since the early 1900s, much of the forests have returned to the basin.

One of the first interbasin transfers of water in Nevada occurred because of the mining boom at Virginia City and Gold Hill. Water needed to supply these growing cities and their mining industry, as well as growth in Carson City, the State capitol, resulted in the creation of Marlette Lake, Hobart Reservoir, Spooner Lake, and a system of flumes and pipelines. Flumes entered a 4,000-foot tunnel through the Carson Range and into a pipeline that could deliver up to 10 million gallons per day to Virginia City (a complete history can be found at http://parks.nv.gov/ltbc.htm). This pipeline system still works today.

Some interesting facts about the Marlette Lake Water System: The project involved 21.47 miles of pipeline, 45.73 miles of flume, it used an inverted siphon consisting of a 12-inch diameter riveted iron pipeline to move water upgradient, and the pipeline was constructed over the roughest 7-mile section in just 6 weeks using only men and mules (American Society of Civil Engineers, 2005).

Besides being known for the incredible scenic beauty, Lake Tahoe also is famous for its clarity. The clarity is measured based on the Secchi depth, which is a measurement based on lowering an 8–10 inch white disc into the lake on a line. The deepest point of visual contact indicates the depth of clarity. The clarity of Lake Tahoe presently is about 60 feet deep (varies with season and location in the lake) and this clarity has declined at an average rate of about 1 foot per year for about the last 35 years. The reason for the loss of clarity has been attributed to increased algal growth related to increased nutrients in the lake and to increased suspended sediment related to stream transport of sediment to the lake. These and other issues of water quality are being addressed by numerous researchers working in the basin.

Lake Tahoe, often referred to as the "Jewel of the Sierras," certainly is one of the most beautiful places on Earth and a major attraction in Nevada. Hopefully, we will continue to enjoy its scenic beauty and clarity for many more generations.



SELECTED HYDROLOGIC FEATURES OF LAKE TAHOE BASIN AND SURROUNDING AREA, CALIFORNIA AND NEVADA, 1998

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Lake Mead from Space (Las Vegas is not in this image but is in the direction of the lower left corner of the photo).

Image by Jesse Allen, NASA, based on data provided by the Landsat 7 Science Team, available at http://earthobservatory.nasa.gov/Study/LakeMead/